4.7 Noise and Vibration

This section of the EIR evaluates potential noise impacts resulting from implementation of the project. This analysis is based on the *Noise Technical Report* prepared by Dudek (Dudek 2024d). A copy of the report is included in **Appendix E**, *Noise Technical Report*.

4.7.1 Existing Conditions

4.7.1.1 Noise Definitions and Overview of Sound Measurement

Fundamentals of Environmental Noise

Noise is defined as unwanted or annoying sound that interferes with or disrupts normal activities. Exposure to high noise levels has been demonstrated to cause hearing loss. The individual human response to environmental noise is based on the sensitivity of that individual, the type of noise that occurs, and when the noise occurs.

Noise level (or volume) is generally measured in decibels (dB) using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound pressure levels to be consistent with that of human hearing response, which is most sensitive to frequencies around 4,000 Hertz (about the highest note on a piano) and less sensitive to low frequencies (below 100 Hertz). The dB scale is logarithmic, not linear, and therefore sound levels cannot be added or subtracted through ordinary arithmetic. Two sound levels 10 dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted (dBA), an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70 dBA sound is half as loud as an 80 dBA sound and twice as loud as a 60 dBA sound. When two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions (Federal Transit Administration [FTA] 2018).

Sound pressure level is measured on a logarithmic scale, with the 0 dBA level based on the lowest detectable sound pressure level that people can perceive (an audible sound that is not zero sound pressure level). Based on the logarithmic scale, a doubling of sound energy is equivalent to an increase of 3 dBA, and a sound that is 10 dBA less than the ambient sound level has no effect on ambient noise. Because of the nature of the human ear, a sound must be about 10 dBA greater than the reference sound to be judged as twice as loud. In general, a 3 dBA change in community noise levels is noticeable, while 1 to 2 dBA changes generally are not perceived.

Sound levels attenuate (or reduce) at a rate of approximately 3 dB for each doubling of distance from a line source, such as a roadway, depending on ground surface characteristics (Federal Highway Administration [FHWA] 2011). No excess attenuation is assumed for hard surfaces like a parking lot or a body of water. Soft surfaces, such as soft dirt or grass, can absorb sound, so an excess ground-attenuation value of 1.5 dB per doubling of distance is normally assumed. For line sources, an overall attenuation rate of 3 dB per doubling of distance is assumed (FHWA 2011).

In addition to the actual instantaneous measurement of sound levels, the duration of sound is important since sounds that occur over a long period of time are more likely to be an annoyance or cause direct physical damage or environmental stress. One of the most frequently used noise

metrics that considers both duration and sound power level is the equivalent noise level (L_{eq}). The L_{eq} is defined as the single steady A-weighted level that is equivalent to the same amount of energy as that contained in the actual fluctuating levels over a period of time (essentially, the average noise level). Typically, L_{eq} is summed over a 1-hour period. L_{max} is the highest root mean squared (RMS) sound pressure level within the measuring period, and L_{min} is the lowest RMS sound pressure level within the measuring period.

The time period in which noise occurs is also important since noise that occurs at night tends to be more disturbing than that which occurs during the day. Community noise is usually measured using day-night average level (L_{dn}), which is the 24-hour average noise level with a 10 dBA penalty for noise occurring during nighttime (10 p.m. to 7 a.m.) hours, or Community Noise Equivalent Level (CNEL), which is the 24-hour average noise level with a 5 dBA penalty for noise occurring from 7 p.m. to 10 p.m. and a 10 dBA penalty for noise occurring from 10 p.m. to 7 a.m. Noise levels described by L_{dn} and CNEL usually do not differ by more than 1 dBA. Daytime L_{eq} levels are louder than L_{dn} or CNEL levels; thus, if the L_{eq} meets noise standards, the L_{dn} and CNEL are also met.

Noise levels may also be reduced by intervening structures. Generally, a single row of detached buildings between the receptor and the noise source reduces the noise level by approximately 5 dBA (FHWA 2008). A solid wall or berm generally reduces noise levels by approximately 10 to 20 dBA (FHWA 2011). Noise barriers or enclosures specifically designed to reduce site-specific construction noise can provide a sound reduction of 35 dBA or greater (Western Electro-Acoustic Laboratory, Inc. 2000).

The manner in which older homes in California were constructed generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows (California Department of Transportation [Caltrans] 2002). The exterior-to-interior reduction of newer residential units is generally 30 dBA or more (Harris Miller, Miller & Hanson Inc. 2006). Generally, in exterior noise environments ranging from 60 dBA CNEL to 65 dBA CNEL, interior noise levels can be maintained below 45 dBA, a general residential interior noise standard, with the incorporation of an adequate forced air mechanical ventilation system in each residential building and standard thermal-pane residential windows/doors with a minimum rating of Sound Transmission Class (STC) 28.

Examples of typical noise levels for common indoor and outdoor activities are depicted in **Table 4.7-1**, *Typical Sound Levels in the Environment and Industry*.

Sound Propagation

Sound propagation (i.e., the traverse of sound from a noise emission source position to a receiver location) is influenced by multiple factors that include geometric spreading, ground absorption, atmospheric effects, and occlusion by natural terrain and/or features of the built environment.

Sound levels attenuate (or diminish) geometrically at a rate of approximately 6 dBA per doubling of distance from an outdoor point-type source due to the spherical spreading of sound energy with increasing distance travelled. The effects of atmospheric conditions such as humidity, temperature, and wind gradients are typically distance-dependent and can also temporarily either increase or decrease sound levels measured or perceived at a receptor location. In general, the greater the distance the receiver is from the source of sound emission, the greater the potential for variation in sound levels at the receptor due to these atmospheric effects. Additional attenuation can result

TABLE 4.7-1
TYPICAL SOUND LEVELS IN THE ENVIRONMENT AND INDUSTRY

Common Outdoor Activities	Noise Level	Common Indoor Activities
—	110	Rock band
Jet fly over at 1,000 feet	100	—
Gas lawn mower at 3 feet	90	—
Diesel truck at 50 feet, at 50 miles per hour	80	Food blender at 3 feet; garbage disposal at 3 feet
Noisy urban area, daytime; gas lawn mower at 100 feet	70	Vacuum cleaner at 10 feet
Commercial area; heavy traffic at 300 feet	60	Normal speech at 3 feet
Quiet urban, daytime	50	Large business office; dishwasher next room
Quiet urban, nighttime	40	Theater; large conference room (background)
Quiet suburban, nighttime	30	Library
Quiet rural, nighttime	20	Bedroom at night; concert hall (background)
—	10	Broadcast/Recording studio
Lowest threshold of human hearing	0	Lowest threshold of human hearing

SOURCE: Caltrans 2013

from sound path occlusion and diffraction due to intervention of natural (ridgelines, dense forests, etc.) and built features (such as solid walls, buildings and other structures).

Human Response to Change in Noise Levels

Under controlled conditions in an acoustics laboratory, the trained, healthy human ear is able to discern changes in sound levels of 1 dBA when exposed to steady, single-frequency signals in the mid-frequency range. A doubling of sound energy results in a 3 dBA increase in sound, which means that a doubling of sound energy (e.g., doubling the volume of traffic on a road) would result in a barely perceptible change in sound level. A change of 5 dBA is readily perceptible, and a change of 10 dBA is perceived as twice (if a gain) or half (if a loss) as loud.

Fundamentals of Groundborne Vibration

Groundborne vibration is fluctuating or oscillatory motion transmitted through the ground mass (i.e., soils, clays, and rock strata). The strength of groundborne vibration attenuates rapidly over distance. Some soil types transmit vibration quite efficiently; other types (primarily sandy soils) do not.

Vibration energy spreads out as it travels through the ground, causing the vibration amplitude to decrease with distance away from the source. Ambient and source vibration are often expressed in terms of the peak particle velocity (PPV) or root mean square velocity (RMS) in inches per second

(in/sec) that correlates best with human perception. Groundborne vibration can be a concern for nearby neighbors of a transit system route or maintenance facility, causing buildings to shake and rumbling sounds to be heard. In contrast to airborne noise, groundborne vibration is not a common environmental problem. It is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. Some common sources of groundborne vibration are trains, buses on rough roads, and construction activities such as blasting, pile-driving and operating heavy earth-moving equipment.

4.7.1.2 Sensitive Receptors

Noise Sensitive Land Uses

Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Additional land uses such as parks, historic sites, cemeteries, and recreation areas are considered sensitive to increases in exterior noise levels. Schools, churches, hotels, libraries, and other places where low interior noise levels are essential are also considered noise-sensitive land uses. The nearest sensitive receptors to the project site are the single-family residences immediately adjacent to the western and southern boundaries of the site.

Vibration Sensitive Land Uses

There are three primary types of receivers that can be adversely affected by ground vibration: people, structures, and equipment (Caltrans 2020). Vibration-sensitive land uses include facilities where vibration would interfere with operations within the building, such as vibration-sensitive research and manufacturing, hospitals with vibration-sensitive equipment, and university research operations. The degree of sensitivity to vibration depends on the specific equipment that would be affected by the vibration. Electron microscopes and high-resolution lithography equipment function within certain scientific and manufacturing tolerances that can be compromised in high vibration environments. Certain fragile older or historic buildings may be vulnerable to damage from excessive vibration. Residential uses are also sensitive to excessive levels of vibration of either a regular or an intermittent nature. The nearest existing vibration sensitive land uses in the project vicinity include single-family residences immediately adjacent to the western and southern boundaries of the site.

4.7.1.3 Existing Noise Environment

Primary noise sources in the project vicinity include noise associated with traffic on area roadways, aircraft and helicopter noise, the sounds of leaves rustling, and birdsong. Short-term noise levels in the project vicinity were measured at three locations that represent existing noise-sensitive receptors (**Figure 4.7-1,** *Noise Measurement Locations*). **Table 4.7-2**, *Measured Baseline Outdoor Ambient Noise Levels*, summarizes the measurement details and recorded noise levels. As shown in Table 4.7-2, ambient noise levels ranged from 49.8 dBA L_{eq} adjacent to the project site, south of Ocean Bluff Way (noise measurement site ST1) to 69.6 dBA L_{eq} near the intersection of Encinitas Boulevard and Delphinium Street (noise measurement site ST3). Noise levels directly adjacent to the

Source: Dudek 2024

Figure 4.7-1

Noise Measurement Locations

OCEAN BLUFF RESIDENTIAL EIR

BARANEK
Consulting Group

project site and at the western project boundary (noise measurement sites ST1 and ST2, respectively) are below 60 dBA as these locations are not within close proximity to a major roadway. Noise measurement levels at the intersection of Encinitas Boulevard and Delphinium Street are higher (69.6 dBA) due to the measurement location at the intersection of a major roadway.

TABLE 4.7-2
MEASURED BASELINE OUTDOOR AMBIENT NOISE LEVELS

Site	Location/Address	Date/Time	L_{eq} (dBA)	L_{max} (dBA)
ST1	Adjacent project site, south of Ocean Bluff Way	2023-04-05, 10:25 a.m. to 10:35 a.m.	49.8	62.3
ST2	Western project boundary	2023-04-05, 10:40 a.m. to 10:50 a.m.	54.1	59.7
ST3	Intersection of Encinitas Boulevard and Delphinium Street	2023-04-05, 11:00 a.m. to 11:10 a.m.	69.6	77.9

SOURCE: Dudek 2024d

NOTES: L_{eq} = equivalent continuous sound level (time-averaged sound level); L_{max} = maximum sound level during the measurement interval; dBA = A-weighted decibels; ST = short-term noise measurement locations

The nearest airport to the project site is the McClellan-Palomar Airport, located approximately 5.5 miles north of the project site. The project site is outside of the 60 dBA CNEL contour for the airport (San Diego County Regional Airport Authority 2011).

4.7.2 Regulatory Framework

4.7.2.1 Federal

Federal Transit Administration

In its Transit Noise and Vibration Impact Assessment guidance manual, the FTA recommends a daytime construction noise level threshold of 80 dBA L_{eq} over an 8-hour period (FTA 2018) when detailed construction noise assessments are performed to evaluate potential impacts to community residences surrounding a project. Although this FTA guidance is not a regulation, it can serve as a quantified standard in the absence of such noise limits at the state and local jurisdictional levels.

4.7.2.2 State

California Code of Regulations, Title 24

Title 24 of the California Code of Regulations sets standards that new development in California must meet. According to Title 24, interior noise levels are not to exceed 45 dBA CNEL in any habitable room.

California Department of Health Services Guidelines

The California Department of Health Services has developed guidelines of community noise acceptability for use by local agencies (California Governor's Office of Land Use and Climate Innovation2017). Selected relevant levels are listed here:

- Below 60 dBA CNEL: normally acceptable for low-density residential use
- 60 to 70 dBA: conditionally acceptable for low-density residential use
- Below 65 dBA CNEL: normally acceptable for high-density residential use and transient lodging
- 60 to 70 dBA CNEL: conditionally acceptable for high-density residential, transient lodging, churches, educational, and medical facilities

The normally acceptable exterior noise level for single-family residential use is up to 60 dBA CNEL.

California Department of Transportation

In its Transportation and Construction Vibration Guidance Manual (Caltrans 2013), Caltrans recommends 0.5 inches per second (ips) peak particle velocity (PPV) as a threshold for the avoidance of structural damage to typical newer residential buildings exposed to continuous or frequent intermittent sources of groundborne vibration. For transient vibration events, such as blasting, the damage risk threshold would be 1.0 ips PPV (Caltrans 2013) at the same type of newer residential structures. For older structures, these guidance thresholds would be more stringent: 0.3 ips PPV for continuous/intermittent vibration sources, and 0.5 ips PPV for transient vibration events. With respect to human annoyance, Caltrans guidance indicates that building occupants exposed to continuous groundborne vibration above 0.2 ips PPV would find it "annoying" and thus a likely significant impact. Although these Caltrans guidance thresholds are not regulations, they can serve as quantified standards in the absence of such limits at the local jurisdictional level.

4.7.2.3 Local

City of Encinitas General Plan and Local Coastal Plan

The General Plan states that a goal of the City is to analyze proposed land uses to ensure that the designations would contribute to a proper balance of land uses within the community. The Noise Element of the General Plan contains the following relevant goals and policies for the project related to noise:

> GOAL 1: Provide an acceptable noise environment for existing and future residents of the City of Encinitas.
>
> > Policy 1.7: Apply Title 24 of the California Administrative Code, associated with noise insulation standards, to single-family dwellings.

GOAL 2: Require that new development be designed to provide acceptable indoor and outdoor noise environments.

Policy 2.1: The Noise and Land Use Compatibility Guidelines and the accompanying discussion set forth the criteria for siting new development in the City of Encinitas. Any project which would be located in a normally unacceptable noise exposure area, based on the Land Use Compatibility Guidelines, shall require an acoustical analysis. Noise mitigation in the future shall be incorporated in the project as needed. As a condition of approval of a project, the City may require post-construction noise monitoring and sign off by an acoustician to ensure that City requirements have been met.

GOAL 3: Ensure that residents are protected from harmful and irritating noise sources to the greatest extent possible.

Policy 3.1: The City will adopt and enforce a quantitative noise ordinance to resolve neighborhood conflicts and to control unnecessary noise in the City of Encinitas. Examples of the types of noise sources that can be controlled through the use of a quantitative noise ordinance are barking dogs, noisy mechanical equipment such as swimming pool and hot tub pumps, amplified music in commercial establishments, etc.

GOAL 4: Provide for measures to reduce noise impacts from stationary noise sources.

Policy 4.1: Ensure inclusion of noise mitigation measures in the design and operation of new and existing development.

In addition, the Noise Element addresses nuisance noise and states that it should be unlawful for any person to make or continue any loud, unnecessary noise that causes annoyance to any reasonable person of normal sensitivity.

Encinitas Municipal Code

The EMC establishes noise criteria to prevent noise and vibration that may jeopardize the health or welfare of the City's residents or degrade their quality of life. Chapter 9.32, *Noise Abatement and Control*, and Chapter 30.40, *Performance Standards*, establish property line noise level limits. These limits apply to existing uses but also apply to future uses and are used for evaluating potential impacts of future on-site generated noise levels. Chapter 9.32.410 states that it shall be "unlawful for any person, including the City, to operate construction equipment at any construction site on Sundays, and days appointed by the President, Governor, or the City Council for a public fast, thanksgiving, or holiday. Notwithstanding the above, a person may operate construction equipment on the above specified days between the hours of 10:00 a.m. and 5:00 p.m. No such equipment, or combination of equipment regardless of age or date of acquisition, shall be operated so as to cause noise at a level in excess of 75 decibels for more than eight hours during any 24-hour period when measured at or within the property lines of any property which is developed and used either in part or in whole for residential purposes."

The property line noise limits are summarized in **Table 4.7-3**, *City of Encinitas Exterior Noise Limits*. As stated in Chapter 30.40.10, "Every use shall be so operated that the noise generated does not exceed the following levels at or beyond the lot line and does not exceed the limits of any adjacent zone."

TABLE 4.7-3
CITY OF ENCINITAS EXTERIOR NOISE LIMITS

Adjacent Zone	Noise Level (dBA)	
	7 a.m. to 10 p.m.	10 p.m. to 7 a.m.
Rural Residential (RR), Rural Residential-1 (RR-1), Rural Residential-2 (RR-2), Residential-3 (R-3), Residential-5 (R-5), Residential-8 (R-8)	50	45
Residential-11 (R-11), Residential Single Family-11 (RS-11), Residential-15 (R15), Residential-20 (R-20), Residential-25 (R-25), Mobile Home Park (MHP)	55	50
Office Professional (OP), Limited Local Commercial (LLC), Local Commercial (LC), General Commercial (GC), Limited Visitor Serving Commercial (L-VSC), Visitor Serving Commercial (VSC)	60	55
Light Industrial (L-I), Business Park (BP)	60	55

SOURCE: Dudek 2024d

4.7.3 Thresholds and Methodology

4.7.3.1 Thresholds of Significance

According to Appendix G of the CEQA Guidelines, a significant noise impact would occur if the project results in any of the following:

- Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
- Generation of excessive groundborne vibration or groundborne noise levels.
- Exposure of people residing or working in the project area to excessive noise levels (for a project located within the vicinity of a private airstrip or an airport land use plan, or where such a plan has not been adopted, within 2 miles of a public airport or public use airport).

In light of the significance criteria, the project noise analysis uses the following standards to evaluate potential noise and vibration impacts:

- **Construction noise** – EMC Chapter 9.32.410 outlines requirements for construction work hours and noise levels. The Encinitas Noise Ordinance states that no construction work shall be performed before 7:00 a.m. or after 7:00 p.m. on Monday through Saturday, and it is prohibited on Sundays and City holidays. Construction activity must not cause an hourly average sound level greater than 75 decibels over an 8-hour period on property zoned or used for residential purposes. An exception is made for individuals performing construction work on their own property for non-commercial purposes, allowing such activities between 10:00 a.m. and 5:00 p.m. on Sundays and City holidays.

In accordance with the Encinitas Noise Ordinance, the project noise impact analysis uses 75 dBA as the construction noise impact criterion over an hourly average during permitted daytime hours.

- **Off-site project-attributed transportation noise** – For purposes of the project noise impact analysis, a direct roadway noise impact would be considered significant if increases in roadway traffic noise levels attributed to the project were greater than 3 dBA CNEL at an existing noise-sensitive land use.
- **Off-site project-attributed stationary noise** – For purposes of the project noise impact analysis, a noise impact would be considered significant if noise from typical operation of heating, ventilation, and air conditioning and other electro-mechanical systems associated with the project exceeded 50 dBA hourly L_{eq} at the property line from 7:00 a.m. to 9:59 p.m., and 45 dBA hourly L_{eq} from 10:00 p.m. to 6:59 a.m.
- **Construction vibration** – Guidance from Caltrans indicates that a vibration velocity level of 0.2 ips PPV for continuous and intermittent vibration sources received at a structure would be considered annoying by occupants within (Caltrans 2020). As for the receiving structure itself, Caltrans guidance recommends that a vibration level of 0.3 ips PPV for continuous and intermittent vibration sources would represent the threshold for building damage risk to an older residential structure.

For purposes of disclosure, since current CEQA noise criteria do not consider it, the project noise impact analysis also evaluates compatibility of on-site noise exposure levels (e.g., from roadway traffic) with the City's exterior and interior noise standards of 65 dBA CNEL and 45 dBA CNEL, respectively.

4.7.3.2 Methodology

Noise Measurements

Noise measurements were conducted near the project site on April 5, 2023, to quantify and characterize the existing outdoor ambient sound levels. Table 4.7-2 provides the location, date, and time period at which these baseline noise level measurements were performed.

Construction Noise Modeling

A Microsoft Excel–based noise prediction model emulating and using reference data from the Federal Highway Administration Roadway Construction Noise Model (RCNM) (FHWA 2008) was used to estimate construction noise levels at the nearest occupied noise-sensitive land use. Although the RCNM was funded and promulgated by the Federal Highway Administration, it is often used for non-roadway projects, because the same types of construction equipment used for roadway projects are often used for other types of construction.) Input variables for the predictive modeling consist of the equipment type and number of each (e.g., two graders, a loader, a tractor), the "acoustical usage factor" (AUF) for each piece of equipment (e.g., percentage of time within a specific time period, such as an hour, when the equipment is expected to operate at full power or capacity and thus make noise at a level comparable to what is presented in Table 4.7-4 below), and the distance from the noise-sensitive receiver. The predictive model also considers how many hours that equipment may be on site and operating (or idling) within an established work shift. The RCNM has default AUF values for

various pieces of construction equipment and vehicles, which were derived from an extensive study of typical construction activity patterns and thus considered appropriate for use in the noise analysis.

Traffic Noise Modeling

Potential noise effects from vehicular traffic were assessed using the FHWA's Traffic Noise Model (TNM) version 2.5 (FHWA 2004). Information used in the model included the roadway geometry, existing (year 2023) and existing plus project traffic volumes and posted traffic speeds. Noise levels were modeled at representative noise-sensitive receivers ST1, ST2, and ST3 as shown in Figure 4.7-1. The receivers were modeled to be five feet above the local ground elevation. In addition, the FHWA TNM software was also used to predict the existing-with-project scenario traffic noise levels at multiple on-site exterior areas that include representative positions for the exteriors of positions of five of the proposed project building facades.

4.7.4 Impact Analysis

4.7.4.1 Impact 4.7-1: Ambient Noise Levels

Construction

Construction of the project would require demolition activities, site clearing, grading, installation of underground utilities and infrastructure, construction of new buildings, paving, and application of architectural coatings. These activities would generate elevated noise levels for nearby residences, including those directly adjacent to the project boundary to the west and south. The magnitude of the noise impact would depend on the type of construction activity, equipment, duration of each construction phase, distance between the noise source and receiver, and any intervening structures. All construction equipment would not operate at the same time, would be located throughout the project site, and would therefore not remain at the same distance to nearby residences during the entirety of daily construction activities. **Table 4.7-4**, *Construction Equipment Maximum Noise Levels*, provides the typical noise levels for various construction equipment anticipated to be used for general construction activities at a 50-foot distance. The equipment noise levels presented in Table 4.7-4 are maximum noise levels. Usually, construction equipment operates in alternating cycles of full power and low power, producing average noise levels over time that are less than the maximum noise levels identified in the table.

Estimated construction noise levels were modeled for the project site, and the results are presented in **Table 4.7-5**, *Predicted Construction Noise Levels per Activity Phase at Sensitive Noise Receptors*. As shown in Table 4.7-5, noise levels for construction activities occurring adjacent to the western and southern project boundaries at the nearest existing residences (located at a distance of 20 feet) is up to 88 dBA over an 8-hour period for demolition and grading activities. Other construction phases would produce noise levels ranging from 79 dBA (for architectural coatings) to 86 dBA (for site preparation activities) at the nearest sensitive receptor. Additionally, for construction activities occurring at the center of the site, noise levels at the nearest sensitive receptors would range from 65 dBA for architectural coating up to 79 dBA for grading activities. Refer to the project *Noise Technical Report* (Appendix E) for additional details regarding the modeling inputs and scenarios. EMC Chapter 9.32, *Noise Abatement and Control*, establishes a daytime threshold for construction noise levels of 75 dBA. Proposed construction activities associated with the project would exceed the

City's threshold of 75 dBA, with the highest construction noise level modeled at 88 dBA, which exceeds the City's threshold by 13 dBA. Construction noise levels would result in a potentially significant noise impact for short-term construction activities.

TABLE 4.7-4
CONSTRUCTION EQUIPMENT MAXIMUM NOISE LEVELS

Equipment Type	Typical Equipment (L_{max}, dBA at 50 feet)
All Other Equipment > 5 HP	85
Backhoe	78
Concrete Saw	90
Compressor (air)	78
Crane	81
Dozer	82
Excavator	81
Flat Bed Truck	74
Front End Loader	79
Generator	72
Grader	85
Man Lift	75
Paver	77
Roller	80
Scraper	84
Welder/Torch	73

SOURCE: Dudek 2024d

TABLE 4.7-5
PREDICTED CONSTRUCTION NOISE LEVELS PER ACTIVITY PHASE AT SENSITIVE NOISE RECEPTORS (8-HOUR L_{EQ})

Construction Phase (and Equipment Types Involved	Nearest Noise-Sensitive Receptor to Construction Site Boundary (dBA)	Nearest Noise-Sensitive Receptor to Acoustical Centroid of Site (dBA)	Exceeds Hourly L_{eq} 75 dBA Over an 8-hour Period
Demolition (concrete saw, excavator, dozer)	**88**	**77**	Yes (both locations)
Site Preparation (dozer, backhoe)	**86**	**76**	Yes (both locations)
Grading (excavator, grader, dozer, scraper, backhoe)	**88**	**79**	Yes (both locations)
Building Construction (crane, man-lift, generator, backhoe, welder)	**85**	73	Yes (for nearest receptors to construction site boundary)
Paving (paver, roller, concrete mixer truck)	**85**	73	Yes (for nearest receptors to construction site boundary)
Architectural Coating (compressor)	**79**	65	Yes (for nearest receptors to construction site boundary)

SOURCE: Dudek 2024d

NOTE: **Bolded** numbers indicate an exceedance of the City's hourly 75 dBA threshold.

ABBREVIATIONS: L_{eq} = equivalent noise level; dBA = A-weighted decibels

Operation

Off-Site Traffic Noise Exposure

The project would result in the generation of additional vehicle trips on local arterial roadways, including Westlake Street and Requeza Street (LOS Engineering 2024a), which could result in increased traffic noise levels at adjacent noise-sensitive land uses (i.e., residences). The estimated trip generation associated with the project is 270 average daily trips (ADT). Noise associated with project traffic was modeled at the three noise measurement locations representing noise-sensitive receivers for the project (refer to Figure 4.7-1). The results of the modeling are summarized in **Table 4.7-6**, *Roadway Traffic Noise Modeling Results*. As shown in Table 4.7-6, traffic generated from the project (270 ADT) would not increase existing noise levels at any of the three modeled locations. As such, the project would not exceed the 3 dBA CNEL threshold for traffic noise increases and *no impact* associated with off-site traffic noise exposure would occur.

TABLE 4.7-6
ROADWAY TRAFFIC NOISE MODELING RESULTS

Modeled Receiver No.	Existing (2022) Noise Level (dBA CNEL)	Existing with Project Noise Level (dBA CNEL)	Maximum Project-Related Noise Level Increase (dBA)
ST1	43.3	43.3	0.0
ST2	48.1	48.1	0.0
ST3	69.2	69.2	0.0

SOURCE: Dudek 2024d

ABBREVIATIONS: dBA = A-weighted decibel; CNEL = community noise equivalent level; dB = decibel

On-site Stationary Noise Sources

During long-term operation of the project, noise would be generated from stationary noise sources, such as residential unit heating, ventilation and air conditioning (HVAC) systems. The closest existing noise-sensitive residential receptor to the west of the project site would be 40 feet from the nearest HVAC condenser unit, which would be expected to have a noise level of 68 dBA at 3 feet, based on manufacturer specifications. The predicted sound emission level from the combination of all operating condenser units as received by the off-site single-family home to the west of the project would be 45 dBA L_{eq}, which would be compliant with the City's nighttime threshold of 45 dBA hourly L_{eq}. As such, the operation of HVACs at the project site would result in a *less than significant* noise impact.

4.7.4.2 Groundborne Vibration

Construction activities may expose persons to excessive groundborne vibration or groundborne noise, causing a potentially significant impact. Caltrans has collected groundborne vibration information related to construction activities (Caltrans 2020). Information from Caltrans indicates that continuous vibrations with a PPV of approximately 0.2 ips is considered annoying. For context, heavier pieces of construction equipment, such as a bulldozer that may be expected on the project site, have peak particle velocities of approximately 0.089 ips or less at a reference distance of 25 feet (DOT 2006).

Groundborne vibration attenuates rapidly, even over short distances. The attenuation of groundborne vibration as it propagates from source to receptor through intervening soils and rock strata can be estimated with expressions found in FTA and Caltrans guidance. By way of example, for a bulldozer operating on site and as close as the western and southern project boundaries (i.e., 20 feet from the nearest occupied property) the estimated vibration velocity level would be 0.12 ips, which is less than the 0.2 ips PPV guidance-based limit, and the impact of vibration-induced annoyance to occupants of nearby existing homes would be *less than significant*.

Construction vibration, at sufficiently high levels, can also present a building damage risk. However, anticipated construction vibration associated with the project would yield levels of 0.12 ips, which do not surpass the guidance limit of 0.3 ips PPV for building damage risk to older residential structures (Caltrans 2020). Because the predicted vibration level at 20 feet is less than this guidance limit, the risk of vibration damage to nearby structures is considered *less than significant*.

The residential uses of the project do not include major producers of groundborne vibration. Anticipated mechanical systems like HVAC units are designed and manufactured to feature rotating (fans, motors) and reciprocating (compressors) components that are well-balanced with isolated vibration within or external to the equipment casings. On this basis, potential vibration impacts due to proposed project operation would be *less than significant*.

4.7.4.3 Airport Noise

The project site is not within two miles of any public or private airport. The closest airport to the project site is the McClellan-Palomar Airport, located at a distance of approximately 5.5 miles from the site. The project site is not within the 60 dBA CNEL contour of McClellan-Palomar Airport or for any other airport. As such, the project would not result in the exposure of people residing or working at the project site to excessive noise levels associated with aircraft operations. *No impact* from aviation overflight noise exposure would occur.

4.7.5 Level of Significance before Mitigation

4.7.5.1 Ambient Noise Levels

The project would result in *potentially significant* noise impacts during construction activities. Operational noise impacts would be *less than significant*.

4.7.5.2 Groundborne Vibration

The project would result in *less-than-significant* groundborne vibration impacts.

4.7.5.3 Airport Noise

The project would not result in impacts from aviation overflight noise exposure. *No impact* would occur.

4.7.6 Mitigation Measures

4.7.6.1 Ambient Noise Levels

The following mitigation measure shall be implemented by the project to minimize short-term construction noise impacts to ambient noise in the project area:

> **Mitigation Measure NOI-1: Construction Noise Control.** The project applicant or its contractor shall prepare a construction noise control plan for review and approval by the City of Encinitas Development Services Department. The plan shall include the following measures for onsite noise control and sound abatement that, in aggregate, would yield a minimum of approximately 13 dBA of construction noise reduction during the construction phase of the project:
>
> - Administrative controls (e.g., reduce operating time of equipment and/or prohibit usage of equipment type[s] within certain distances to a nearest receiving occupied off-site property), including, but not limited to:

  - Prohibiting unnecessary idling of internal combustion engines.
  - Locating stationary noise-generating equipment, such as air compressors or portable power generators, as far as possible from sensitive receptors.
  - Notifying of all adjacent residences of the construction schedule, in writing, and providing a written schedule of “noisy” construction activities to the adjacent and nearby residences at least 24 hours prior to initiation of construction activities that could result in substantial noise levels at outdoor or indoor living areas. This notification should include the anticipated hours and duration of construction and a description of noise reduction measures being implemented at the project site. The notification should include the telephone number and/or contact information for the on-site noise control coordinator that neighbors can use for inquiries and/or to submit complaints associated with construction noise.
  - Designation of a noise control coordinator who shall be responsible for responding to any complaints about construction noise. The disturbance coordinator shall determine the cause of the noise complaint (e.g., bad muffler, etc.) and shall require that reasonable measures be implemented to correct the problem. Conspicuously post a telephone number for the disturbance coordinator at the construction site and include it in the notice sent to neighbors regarding the construction schedule.

- Engineering controls (change equipment operating parameters [speed, capacity, etc.], or install features or elements that otherwise reduce equipment noise emission [e.g., upgrade engine exhaust mufflers]), including, but not limited to:
  - Equipping of all internal combustion engine-driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.
  - Electrical power shall be used to run air compressors and similar power tools, where feasible.
  - Internal combustion engines shall be equipped with a muffler of a type recommended by the manufacturer and in good repair.
  - Utilization of "quiet" air compressors and other stationary noise sources where technology exists.
- Installation of a temporary, 8-foot-high noise abatement fence on the site boundary (or within, as practical and appropriate) in the form of flexible sound blankets or comparable solid barriers (e.g., rigid plywood sheeting) to occlude construction noise emissions between the site (or specific equipment operation as the situation may define) and the noise-sensitive receptor(s) of concern. Such temporary barriers shall demonstrate a sound transmission class (STC) rating of at least 20 and shall be installed in a manner that eliminates air gaps between adjoining element edges and the ground surface.

4.7.6.2 Groundborne Vibration

No mitigation measures are required for impacts associated with groundborne vibration.

4.7.6.3 Airport Noise

No mitigation measures are required for impacts associated with aviation overflight noise exposure.

4.7.7 Level of Significance after Mitigation

4.7.7.1 Ambient Noise Levels

Implementation of Mitigation Measure NOI-1 would reduce significant impacts to sensitive noise receptors during construction activities to a *less-than-significant* level. **Table 4.7-7**, *Mitigated Construction Equipment Levels per Activity Phase at Sensitive Noise Receptors*, estimates noise levels for construction activities occurring adjacent to the western and southern project boundaries at the nearest existing residences (located at a distance of 20 feet) and at the center of the site, with mitigation. As shown in Table 4.7-7, with the implementation of Mitigation Measure NOI-1 noise levels would be reduced to levels ranging from 66 dBA (for architectural coatings) to 75 dBA (for demolition activities) at construction site boundaries as shown in the second column of the table, and would be reduced to levels ranging from 53 dBA (for architectural coatings) to 68 dBA (for grading activities) for construction activities at the center of the site, as shown in the fourth column of the table.

TABLE 4.7-7
MITIGATED CONSTRUCTION EQUIPMENT NOISE LEVELS PER ACTIVITY PHASE SENSITIVE NOISE RECEPTORS (8-HOUR L_{EQ})

Construction Phase and Equipment Types Involved	Nearest Noise-Sensitive Receptor to Construction Site Boundary (dBA) (No Mitigation)	Nearest Noise-Sensitive Receptor to Construction Site Boundary (dBA) (with Mitigation)	Nearest Noise-Sensitive Receptor to Acoustical Centroid of Site (dBA) (No Mitigation)	Nearest Noise-Sensitive Receptor to Acoustical Centroid of Site (dBA) (with Mitigation)
Demolition (concrete saw, excavator, dozer)	88	75	77	66
Site Preparation (dozer, backhoe)	86	73	76	65
Grading (excavator, grader, dozer, scraper, backhoe)	88	75	79	68
Building Construction (crane, man-lift, generator, backhoe, welder)	85	71	73	61
Paving (paver, roller, concrete mixer truck)	85	72	73	61
Architectural Coating (compressor)	79	66	65	53

SOURCE Dudek 2024d

ABBREVIATIONS: L_{eq} = equivalent noise level; dBA = A-weighted decibels

4.7.7.2 Groundborne Vibration

No mitigation measures are required for impacts associated with groundborne vibration. Impacts would be *less than significant*.

4.7.7.3 Airport Noise

No mitigation measures are required to reduce impacts associated with aviation overflight noise exposure. *No impact* would occur.